

## REMARKS

Claim 63 has been amended and new claims 81-89 have been added. Support for the new claims is provided by exemplary embodiments of the invention described at page 7 of the originally-filed application. Claims 1, 4-14 and 56-89 remain in the application. Reconsideration of the application in view of the amendments and the remarks to follow is requested.

Claims 63-80 stand rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 80 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 80 stands rejected under 35 U.S.C. §112, fourth paragraph, as being improper for failing to include every limitation of the claims from which they depend. Claims 63, 71-73, 75, 76, and 78 stand rejected under 35 U.S.C. §102(b) as being anticipated by Schuele (5,760,474). Claims 1, 4-11, 13, 14, 56 and 80 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ramakrishnan (5,192,871) in view of Motorola (5,943,580). Claim 12 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Ramakrishnan and Motorola and further in view of Graettinger (5,844,771). Claims 57-59 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ramakrishnan and Motorola and in view of Narui (6,201,728) and Merchant (6,235,594). Claims 60-62 stand rejected under 35

U.S.C. §103(a) as being unpatentable over Ramakrishnan and Motorola in view of Eguchi (5,442,585) and Shrivastava (5,557,122). Claims 63-66 and 73-79 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mihara (5,561,307) in view of Mueller (5,864,496). Claims 64-70 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Schuele in view of Ramakrishnan. Claims 69 and 70 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Schuele in view of Motorola. Claims 67 and 68 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mihara and Mueller in view of Ramakrishnan.

Regarding the §112, first paragraph, rejection against claim 63, such claim recites a first electrode layer having a portion elevationally below uppermost surfaces of two gate structures. The Examiner states that the description in the original disclosure fails to support this limitation (page 2 of paper no. 29). Respectfully, the Examiner is mistaken.

The Examiner is referred to MPEP §2163, (8<sup>th</sup> ed.) Guidelines for the Examination of Patent Applications under 35 U.S.C. 112, Para. 1, "Written Description" Requirement, section I., which explicitly states: "It is now well accepted that a satisfactory description may be in the claims or in any other portion of the originally filed specification....and applicant shows possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams and formulas that fully set forth the claimed invention. Possession may be shown in a variety of ways including...the disclosure of drawings" (citations omitted).

Additionally, the Federal Circuit Court has resolved the issue stating that **drawings alone** may be sufficient to provide the “written description of the invention” required by the first paragraph of 35 U.S.C. §112. *Vas-Cath, Inc. vs. Mahurkar*, 935 F.2d. 1555, 19 USPQ2d 1111, 1118 (Fed. Cir. 1991) (emphasis added). *See also Ex parte Horton*, 226 USPQ 697 (B.P.A.I. 1985) (drawings may be relied upon to satisfy the disclosure requirements of 35 U.S.C. §112).

Accordingly, pursuant to the above authority, drawings alone from the originally-filed application satisfy the description requirement of §112, first paragraph. Referring to Fig. 9 of the originally-filed application, such figure illustrates electrode layer 136 which has a lower portion approximate substrate 112 which is clearly shown below the uppermost surfaces of gate structures 116, 117, 118, and 119 (see also pgs. 11-14). Such disclosure supports a first electrode layer having a portion elevationally below uppermost surfaces of two gate structures as recited in 63. Consequently, pursuant to the above authority, Fig. 9 of the originally-filed disclosure provides the required written description for claim 63, and therefore, the rejection based on §112 is inappropriate and should be withdrawn.

Regarding the §112, first paragraph, rejection against claim 71, such claim recites an opening comprises a trench (wherein a first electrode layer is formed within the opening). The Examiner states that the originally filed application does not describe the opening as a trench (page 3 of paper no. 29). The Examiner is mistaken.

The Examiner is respectfully reminded that regarding the rejection based on §112, first paragraph, MPEP 2163.02 (8<sup>th</sup> Ed.) states the test for sufficiency of support in an application is whether the disclosure relied upon reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter. MPEP 2163.01 (8<sup>th</sup> Ed. *citing* Ralston Purina Co. vs. Far-Mar-Co., Inc., 772 F.2d. 1570, 1575, 227 USPQ 177, 179 (Fed. Cir. 1985) (emphasis added). Notably, “[t]he subject matter of the claim need not be described literally (i.e., using the same terms or *in haec-verba*) in order for the disclosure **to satisfy the description requirement** (MPEP 2163.02 (8<sup>th</sup> Ed.)) (emphasis added). The originally-filed application discusses two exemplary types of capacitors, “cylindrically stacked or trench structures” (pg. 1 of the originally-filed application). Fig. 9 of the originally-filed application discloses exemplary capacitor container openings 130 and 131 having right angled corners (see also pgs. 12-13). Applicant submits such a disclosure would reasonably convey to the artisan skilled in the semiconductor arts that Applicant had possession of the subject matter to a [capacitor] opening that comprises a trench as recited in claim 71, particularly considering the above authority that the subject matter of the claim need not be described literally to satisfy the written description. Consequently, pursuant to the above authority, the originally-filed disclosure provides the required written description for claim 71, and therefore, the rejection based on §112 is inappropriate and should be withdrawn.

Regarding the §112, first paragraph, rejection against claim 76, such claim recites a conductive region comprises a metal compound and conductive barrier

layer. The Examiner states the description in the original disclosure fails to support this limitation because such disclosure allegedly fails to specify the conductive region is to be made of two metal compounds wherein one is a conductive barrier layer material (pg. 3 of paper no. 29). The Examiner is mistaken.

The originally-filed application discloses exemplary aspects described as, "conductive covering regions 134...might comprise conductive polysilicon, metals **and/or** metal compounds, including conductive barrier layers" (pg. 12). The "and/or" allows the sentence to be conjunctive or disjunctive wherein the sentence is appropriately read as the conductive covering regions 134 can comprise any combination of conductive polysilicon, metals and/or metal compounds, and in combination with conductive barrier layers. That is, any combination of one, two or all three of the recited materials (polysilicon, metals, and metal compounds) can be combined with a conductive barrier layer. Therefore, the written description for the claim 76 recitation of a conductive region comprises a metal compound and conductive barrier layer is provided in the originally-filed application. Consequently, pursuant to the above authority, the originally-filed disclosure provides the required written description for claim 76, and therefore, the rejection based on §112 is inappropriate and should be withdrawn.

Regarding the §112, first paragraph, rejection against claim 77, such claim recites a conductive region comprises a material different than material of a first electrode layer. The Examiner states that such is not supported by the

disclosure because the originally-filed application fails to specify the conductive region is made from different material than that of first capacitor electrode (pg. 3 of paper no. 29). However, the Examiner is mistaken.

The originally-filed application provides exemplary "conductive covering regions 134...might comprise conductive polysilicon, metals **and/or** metal compounds, including conductive barrier layers" (pg. 12). Additionally, the originally-filed application provides exemplary capacitor storage node layer 136 is formed from exemplary materials which include conductively doped polysilicon, metal and metal compounds, with conductive metal oxides being preferred materials in one aspect (page 13). Accordingly, these disclosures demonstrate that the conductive covering regions can comprise polysilicon while the capacitor storage node layer can comprise metal. An artisan of the semiconductor arts understands that metal and polysilicon **are different materials**, and therefore, the recitation of claim 77 to a conductive region comprises a material different than material of a first electrode layer is satisfied by the written disclosure of the originally-filed application. Pursuant to the above authority, the originally-filed disclosure provides the required written description for claim 77, and therefore, the rejection based on §112 is inappropriate and should be withdrawn.

Regarding the §112, first paragraph, rejection against claim 78, such claim recites a first electrode layer comprises a monolithic unitary material. The Examiner states a monolithic unitary material is not listed in the specification (pg. 4 of paper no. 29). However, the Examiner is mistaken.

Pursuant to the above previously stated authority, the figures and drawings can be used to satisfy the §112, first paragraph, written description requirement. Referring to Fig. 9 of the originally-filed application, storage node layer 136 is clearly shown as a monolithic unitary material, and therefore, the recitation to such limitation is supported by the originally-filed disclosure. Pursuant to the above authority, the originally-filed disclosure provides the required written description for claim 78, and therefore, the rejection based on §112 is inappropriate and should be withdrawn.

Regarding the §112, first paragraph, rejection against claim 80, such claim recites wherein the high K substantially crystalline material layer is less than 80% crystalline. The Examiner states the phrase "less than" causes the claim to be an open ended numerical range with 0% as lower limit not supported by the original disclosure (pg. 4 of paper no. 29). The Examiner is mistaken.

The Examiner is respectfully reminded that a basic tenet of patent law for dependent claims is that "[c]laims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim" 37 CFR § 1.75; MPEP §608.01(i) (8<sup>th</sup> ed.). That is, a dependent claim includes all the limitations of the independent claim from which the dependent claims depends. Accordingly, dependent claim 80 includes all the limitations from independent claim 1 from which it depends, and claim 1 recites "the high K substantially crystalline material layer is at least 70% crystalline". Consequently, the claim 80 recitation to crystalline material layer includes the limitation of at least 70% crystalline from the recitation of claim 1 contrary to the

statement by the Examiner. The rejection against claim 80 based on §112, first paragraph is inappropriate and should be withdrawn.

Regarding the §112, second paragraph, rejection against claim 80, such claim recites wherein the high K substantially crystalline material layer is less than 80% crystalline. The Examiner once again states this is an open ended numerical range with 0% as the lower limit, and further states 0% crystalline is not crystalline, and therefore, contradicts the limitation of claim 1 to a crystalline layer (pg. 4 of paper no. 29). The Examiner is mistaken.

The Examiner is respectfully reminded that MPEP §2173.02 (8<sup>th</sup> ed.) states the essential inquiry pertaining to a §112, second paragraph, requirement is whether the claims set out and circumscribe subject matter with a reasonable degree of clarity and particularity. Claim 1 recites the high K substantially crystalline material layer is at least 70% crystalline and less than 90% crystalline, wherein claim 80 **further limits** (as is the purpose of dependent claims discussed above) the phrase of claim 1 by reciting the high K substantially crystalline material layer is less than 80% crystalline. That is, the numerical range of claim 80 further defines the numerical range recited in claim 1 with an upper end of less than 90% crystalline. Accordingly, Applicant submits the recitation of claim 80 sets out and circumscribes subject matter with a reasonable degree of clarity and particularity, in conformance with the above stated authority. The rejection against claim 80 based on §112, second paragraph is inappropriate and should be withdrawn.

Regarding the §112, fourth paragraph, rejection against claim 80, such

claim recites wherein the high K substantially crystalline material layer is less than 80% crystalline. The Examiner states claim 80 is an improper dependent claims for failing to further limit the claim from which it depends, and once again states this recitation is an open ended numerical range of 0-80% (pg. 5 of paper no. 29). As stated above with respect to the second paragraph rejection against claim 80, claim 80 appropriately further limits claim 1 from which it depends by **further limiting** the phrase at least 70% crystalline and less than 90% crystalline of claim to at least 70% crystalline and less than 80% crystalline. The range recited by claim 80 is clearly narrower than, and further limits, the range recited by independent claim 1, and therefore, claim 80 is a proper dependent claim. The rejection against claim 80 based on §112, fourth paragraph is inappropriate and should be withdrawn.

Regarding the rejection against claim 1 based on the combination of Ramakrishnan (5,192,871) in view of Motorola (5,943,580), such claim recites a high K substantially crystalline material layer is at least 70% crystalline and less than 90% crystalline. The Examiner correctly states Ramakrishnan (5,192,871) fails to teach such limitation and relies on Motorola (5,943,580) to supply the deficiency in teachings (pg. 8 of paper no. 29). However, Motorola (5,943,580) teaches a thermal treatment of an amorphous material can be modified to only partially convert the amorphous material to a crystalline phase, rather than going to 100% crystalline (col. 3, Ins. 5-9). By so doing, Motorola (5,943,580) continues, one is able to create capacitors with a wide range of

dielectric constants (col. 3, Ins. 9-10). Based on this teaching, the Examiner states it is an obvious matter of design choice with routine experimentation to allegedly select the degree of crystallinity and allegedly teach the recited limitation of claim 1 (pg. 8 of paper no. 29).

However, Motorola (5,943,580) (in combination with Ramakrishnan (5,192,871)) fails to provide any teachings to crystallinity ranges. Accordingly, no design choice or routine experimentation can be performed without some basis teachings to **crystallinity ranges** on which to base the design choice and routine experimentation. The Examiner is reminded that a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill in the art. MPEP §2123 (8<sup>th</sup> ed.). That is, in no fair or reasonable interpretation would the teachings of Motorola (5,943,580) and Ramakrishnan (5,192,871) have reasonably suggested or led one having ordinary skill in the art to a design choice of crystallinity ranges by routine experimentation, let alone Applicant's claimed range, because there are no teachings to crystallinity ranges on which one skilled in the art can rely for experimentation. The teaching of Motorola (5,943,580) to modify the thermal treatment of an amorphous material to only partially convert the amorphous material to a crystalline phase, rather than going to 100% crystalline, to create capacitors with a wide range of dielectric constants is completely devoid of any teaching to a relationship of crystallinity ranges as recited in claim 1. Accordingly, in no fair or reasonable interpretation does the combination of Motorola (5,943,580) and Ramakrishnan

(5,192,871) teach or suggest a high K substantially crystalline material layer is at least 70% crystalline and less than 90% crystalline as recited in claim 1. For this reason, the obviousness rejection against claim 1 is improper and should be withdrawn.

Furthermore, the use of routine experimentation and design choice are in disfavor with present law for not presenting a proper obviousness analysis. In referring to a rejection based on such a rationale, the CCPA stated “[t]he problem, however, with such ‘rules of patentability’ (and ever-lengthening list of exceptions which they engender) is that they tend to becloud the ultimate legal issue--obviousness--and exalt the formal exercise of squeezing new factual situations into preestablished pigeonholes. Additionally, **the emphasis upon routine experimentation is contrary to the last sentence of section 103**. *In re Yates*, 663 F.2d 1054, 211 USPQ 1149, 1151 n.4 (CCPA 1981) (emphasis added). Pursuant to this authority, the obviousness rejection against claim 1 is improper and should be withdrawn. Claim 1 is allowable.

Claims 4-14, 56-62 and 80-81 depend from independent claim 1, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

Independent claim 63 stands rejected as being anticipated by Schuele. Claim 63 also stands rejected for obviousness by the combination of Mihara and Mueller. Claim 63 is amended to recite a high K dielectric layer comprising

material other than ferroelectric material. Schuele teaches dielectric layers comprising only ferroelectric layers 14 (col. 3, Ins. 1-10) and 60 (col. 4, Ins. 53-58). Mihara teaches dielectric layers comprising only ferroelectric material (col.11, Ins. 10-20; col. 12, Ins. 15-20). Mueller is devoid of teachings to high K dielectric layers. Consequently, the art of record fails to teach or suggest a high K dielectric layer **comprising material other than ferroelectric material** as recited in claim 63. Claim 63 is allowable.

Moreover, regarding the rejection against claim 63 based on the combination of Mihara and Mueller, such claim recites an opening formed in the insulative material between two gate structures. Mihara does not teach an opening between two gate structures. The Examiner provides the teaching of Mueller to teach such limitation alleging Mueller teaches DRAM chips employ millions of memory cells with a plurality of word lines, and therefore, it is obvious that the opening of Mihara should have been between at least two gate structures since the DRAM chips with the plurality of word lines is common knowledge in the art. The Examiner is reminded, respectfully, that the Federal Circuit has continually cautioned against **myopic** focus on the obviousness of the difference between the claimed invention and the prior art rather than on the obviousness *vel non* of the claimed invention as a whole relative to the prior art as §103 requires. *Hybritech, Inc. v Monoclonal Antibodies, Inc., supra*, 231 USPQ, at 93. **In fact, the Federal Circuit has rejected the notion that ““well known in the art”” can support an obviousness rejection** stating that “it is

irrelevant in determining obviousness that all or all other aspects of the claim may have been well known in the art." *Jones v Hardy*, 727, F2d 1524, 1527, 1528, 220 USPQ 1021, 1024 (Fed. Cir. 1984). Pursuant to this authority, the combination of Mihara and Mueller based on well known in the art is inappropriate, and therefore, the obviousness rejection based on the improper combination fails and should be withdrawn. Claim 63 is allowable.

Claims 64-79 and 82 depend from independent claim 63, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

For example, the rejection against claims 64-68 and 73-79 is based on the improper combination of Mihara and Mueller stated above with respect to independent claim 63, and therefore, the rejection against such claims should be withdrawn.

Additionally, claim 69 recites a high K dielectric layer has at least a portion comprising greater than 70% and less than or equal to 98% crystalline material. Claim 70 recites a high K dielectric layer has at least a portion comprising greater than 70% and less than or equal to 98% amorphous material. The Examiner relies on the combination of Schuele and Ramakrishnan based on the same improper "design choice" rationale for the combination as was presented for the rejection against claim 1. Therefore, for the reasons presented previously with respect to claim 1, the rationale for combining Schuele and Ramakrishnan is improper. Accordingly, the obviousness rejection based on the improper

combination fails and should be withdrawn. Claims 69-70 are allowable.

New independent claim 83 recites the same language as the previous claim 66 that stood rejected in paper no. 26 (previous response) for obviousness based on the combination of Deboer (U.S. Patent No. 5,930,106) in view of Anderson (U.S. Patent No. 5,390,072) (pg. 9 of paper no. 26). Claim 83 recites a high K dielectric layer comprises a portion of amorphous material and a portion of crystalline material. The Examiner correctly stated Deboer fails to teach such limitation and relied on Anderson to supply the deficiency in teachings (pgs. 9-10 of paper no. 26). The Examiner stated it would be obvious to modify the Deboer capacitor by providing a dielectric layer as taught by Anderson to have a crystalline layer and an amorphous layer because Anderson allegedly teaches such provides a more efficient high capacitance-performance capacitor (pg. 11 of paper no. 26). However, modifying the Deboer capacitor to include a crystalline layer and an amorphous layer would render the Deboer capacitor unsatisfactory for its intended purpose contrary to Federal Circuit law. The Examiner is respectfully reminded that if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. MPEP §2143.01 (8th Edition) *citing to In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). The invention of Deboer is to have a capacitor with a dielectric layer within specific thickness tolerances (col. 2, lines 1-15) with the greatest thickness taught to be less than 1,000 angstroms (col. 3, lines 47-61), but preferably 150 angstroms or less, while the thinnest dielectric layer taught by

Anderson is 1,600 angstroms (col. 4, Ins. 25-32). Modifying the Deboer capacitor to have a dielectric layer approximately 50% thicker than the invention teaches would render the Deboer capacitor unsatisfactory for its intended purpose contrary to the above stated authority. Consequently, pursuant to the above authority, there is no suggestion or motivation to make the proposed modification, and therefore, the obviousness rejection based on the improper modification fails and must be withdrawn. For at least reason, claim 83 is allowable.

Claims 84-89 depend from independent claim 83, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

Further, Applicant herewith submits a duplicate copy of the Supplemental Information Disclosure Statement and Form PTO-1449 filed in this application on February 7, 2003. No initialed copy of the PTO-1449 has been received back from the Examiner. To the extent that the submitted references listed on the Form PTO-1449 have not already been considered, and the Form PTO-1449 has not been initialed with a copy being returned to Applicant, such examination and initialing is requested at this time, as well as return of a copy of the initialed Form PTO-1449 to the undersigned.

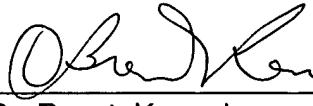
This application is now believed to be in immediate condition for allowance, and action to that end is respectfully requested. If the Examiner's next anticipated action is to be anything other than a Notice of Allowance, the undersigned respectfully requests a telephone interview prior to issuance of any

such subsequent action.

Respectfully submitted,

Dated: 7-14-03

By:

  
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